

PATENT ABSTRACTS OF JAPAN

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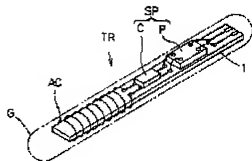
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(54) TRANSPONDER

(57)Abstract:

PURPOSE: To enhance efficiency in the assembling work of a transponder by employing a ferrite board as a base board and winding an antenna coil around the ferrite board.

CONSTITUTION: The transponder TR is implanted under the skin of a domestic animal. The transponder TR is encapsulated in a glass capsule G under a state where an antenna coil AC is wound around a stripe ferrite board 1 closely to one end thereof and a signal processing circuit SP is mounted on the board 1 closely to the other end thereof. The signal processing circuit SP comprises a capacitor C constituting a parallel resonance circuit together with the antenna coil AC, and a main processing part P where a part for recording the identification information of individual, a circuit for controlling transmission/receiving of signal, etc., are formed on a single chip. Since the board 1 has the function of a ferrite core for winding the antenna coil AC and the function of a circuit board for mounting the signal processing circuit SP, the assembling work is simplified and the number of components can be decreased.



CLAIMS

[Claim(s)]

[Claim 1] An antenna coil (AC) and a substrate with which a digital disposal circuit (SP) which connected a terminal of said antenna coil (AC) was mounted, A transponder which is a transponder enclosed with a capsule (G), and has wound said antenna coil (AC) around said ferrite substrate (1) while constituting said substrate from a ferrite substrate (1).

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the transponder which has enclosed with the capsule the antenna coil and the substrate with which the digital disposal circuit which connected the terminal of said antenna coil was mounted.

[0002]

[Description of the Prior Art] This kind of transponder is attached for every various individuals, such as livestock, such as a cow and a sheep, or a load conveyed, and it enables it to perform management of an each object, etc. easily by recording information peculiar to those individuals, such as identification information of that individual. As concrete composition of this transponder, as conventionally shown in drawing 4 (b), Digital-disposal-circuit SP who connected the terminal of winding and its antenna coil AC to the ferrite core 100 for the antenna coil AC in order to receive an electric wave efficiently is mounted on the substrates 101, such as a product made of phenol resin, or a product made from SERAMMIKUSU, There is a thing of composition of enclosing these parts with the capsules G, such as glass, and even the grade in which the embedding to the hypodermic of livestock is possible is miniaturized.

[0003] The capacitor C by which digital-disposal-circuit SP on the substrate 101 constitutes a parallel resonant circuit with the antenna coil AC as shown in drawing 4 (**). If it comprises the main processing part P which carried out 1 chip making of the control circuit for transmission and reception of the Records Department which has recorded the identification information of the individual, etc., and a signal, etc. and the parallel resonant circuit of the antenna coil AC and the capacitor C receives a command signal, The main processing part P transmits the identification information of an individual, etc. from the antenna coil AC by making the command signal itself into electric power, for example. The method etc. which drive the main processing part P directly like composition before by the electric wave which is shown in drawing 4 (**), and which was received in the parallel resonant circuit of the antenna coil AC and the capacitor C. After rectifying the electric wave which the antenna coil AC received, a capacitor is charged and there is also a method which drives the main processing part P with the charged electric power.

[0004] The portion of the antenna coil AC and the portion of the substrate 101 are constituted from composition shown in drawing 4 by the different body, As it takes time and effort the work which encloses the connection work of the antenna coil AC and the substrate 101, and these with the capsule G and is shown in drawing 5 in view of reducing the assembling work efficiency of a transponder, The composition which carries out the fixed coupling of the portion of the antenna coil AC and the portion of the substrate 101 is considered. In the composition shown in drawing 5 (**) which is an A-A' section of drawing 5 (b) and drawing 5 (b). It fits in with each of the ferrite core 100 and the substrate 101, and the receptacle member 103 which connects the ferrite core 100 and the substrate 101 is formed, and the metallic pin 102 of the couple for wiring with the substrate 101 is made to have fitted into the receptacle member 103.

[0005] Regular winding of the both ends of the antenna coil AC wound around the ferrite core 100 is carried out to each of the metallic pin 102 of a couple.

With the metallic pin 102 of the couple, it is being fixed to the electrode pad of the substrate

101 with soldering.

By considering a transponder as the composition shown in drawing 5, where the fixed coupling of the antenna coil AC and the substrate 101 is carried out, since enclosure to the capsule G can be performed, the assembling work efficiency of a transponder is improved.

[0006]

[Problem(s) to be Solved by the Invention]However, conventionally [above-mentioned], in composition, although the assembling work efficiency of a transponder has improved to some extent, from there being many component-parts mark etc., it is not sufficient improvement and also an improvement was desired. This invention is made in view of the above-mentioned actual condition, and the purpose is that it raises the assembling work efficiency of a transponder as much as possible.

[0007]

[Means for Solving the Problem]A transponder of this invention an antenna coil and a substrate with which a digital disposal circuit which connected a terminal of said antenna coil was mounted, While it has enclosed with a capsule and the feature composition constitutes said substrate from a ferrite substrate, it is in a point which has wound said antenna coil around said ferrite substrate.

[0008]

[Function]According to the feature composition of this invention, reception of an efficient electric wave is secured by winding an antenna coil around a ferrite substrate, and the digital disposal circuit is mounted in the ferrite substrate which wound the antenna coil. That is, the ferrite substrate combines the function of the ferrite core for winding an antenna coil, and the function of the circuit board to mount a digital disposal circuit, Can attach both an antenna coil and a digital disposal circuit to a ferrite substrate, and as assembly work of a transponder, What is necessary is just to be able to make the grade of enclosing an antenna coil with a capsule after fixing the both ends and digital disposal circuit of winding and its antenna coil to a ferrite substrate with soldering etc. work to a ferrite substrate.

[0009]

[Effect of the Invention]Since the ferrite substrate combines like the above the function of the ferrite core for winding an antenna coil, and the function of the circuit board to mount a digital disposal circuit according to the above-mentioned feature composition, assembly work is simplified, As for an interval, reduction of component-parts mark can raise the assembling work efficiency of a transponder as much as possible. There is also an advantage which can reduce the influence of an extraneous noise by using a ferrite substrate as the circuit board further.

[0010]

[Example]The example at the time of applying the transponder of this invention to the transponder of the form embedded at the hypodermic of livestock is described based on a drawing. The transponder TR shown in drawing 1 is in the state in the strip-of-paper-like ferrite substrate 1 which mounted the antenna coil AC in end slippage and to which while mounted digital-disposal-circuit SP in end slippage on winding and another side, and is enclosed with the glass capsules G. The capacitor C by which digital-disposal-circuit SP constitutes a parallel resonant circuit with the antenna coil AC. The control circuit for transmission and reception of the Records Department which has recorded the identification information of the individual, etc., and a signal, etc. comprise the main processing part P which carried out 1 chip making, and the capacitor C and the main processing part P. It is being fixed

to the electrode pad which was formed on the ferrite substrate 1 and which is not illustrated by soldering like the both ends of the antenna coil AC.

[0011]The full wave rectifier circuit 10 which carries out full wave rectification of the electric wave received in the parallel resonant circuit which consists of the antenna coil AC and the capacitor C as shown in drawing 2 to the main processing part P, The sequence control circuit 11 which performs sequence control of the main processing part P in response to supply of electric power from the full wave rectifier circuit 10, The clock signal extracting circuit 12 which extracts a clock signal from the electric wave received in the parallel resonant circuit which consists of the antenna coil AC and the capacitor C, The memory 13 which has memorized the individual identification information of livestock, and the data encoder 14 for transforming the memory information on the memory 13 into the code for data transmission of a predetermined form, It has the PSK modulation circuit 15 which carries out PSK modulation of the digital signal coded with the data encoder, and the writing control circuit 16 for writing the data inputted from terminal RT for writing in the memory 13.

[0012]The transponder TR of the above-mentioned composition is used being embedded at the hypodermic of livestock. What is necessary is just to set up suitably according to the kind of livestock, etc., although the case where livestock is a cow and it is embedded by the ear of a cow as a fixing position of the transponder TR at drawing 3, for example is illustrated. The portable terminal H for communication as shown in drawing 3 performs communication with the transponder TR attached to livestock. The terminal H for communication is equipped with the loop antenna 20, the display panel 21, the keyboard 22, and the controlling device which is not illustrated and the cable 23 which performs communication of data, etc., and where the terminal H for communication is close brought into communication available distance with the transponder TR, it communicates.

[0013]If transmission instruction is inputted from the keyboard 22 of the terminal H for communication, about 100-kHz electric wave will be transmitted from the loop antenna 20. The antenna coil AC of the transponder TR and the circuit constant of the capacitor C are set up so that the frequency of the electric wave transmitted from the terminal H for communication and resonance frequency may be in agreement.

It is rectified in the full wave rectifier circuit 10, and electric power is supplied to the electric wave received by the antenna coil AC and the capacitor C by latter sequence control circuit 11 grade.

If the sequence control circuit 11 is started in response to supply of electric power, it will issue directions according to a predetermined sequence so that the memory information on the memory 13 may be sent to a data encoder. The sequence control circuit 11 controls synchronizing with the clock signal sent from the clock extraction circuit 12.

[0014]The individual identification information which becomes the memory 13 from the kind of livestock, such as an area where a livestock administrator's nationality, a livestock administrator's corporate name, and livestock are managed, and the individual numbers of livestock is beforehand memorized by the input from terminal RT for writing.

These memory information is sent to a data encoder one by one by the directions from the sequence control circuit 11.

The data encoder 14 changes the memory information sent from the memory 13 into the form for predetermined data communications containing the numerals for error detection, and sends it to the PSK modulation circuit 15. The PSK modulation circuit 15 carries out PSK modulation of the data changed with the data encoder 14, and sends and transmits it to the

antenna coil AC.

[0015]After this transmit radio wave is received by the loop antenna 20 of the terminal H for communication, it is got over and decoded within the terminal H for communication, and the individual identification information of the above-mentioned livestock is taken out. The individual identification information of this livestock is sent to the controlling device which is not illustrated via the cable 23. In the controlling device side, when measurement of body weight, various kinds of inspections, etc. of livestock (it is a cow in the case of this example) are being conducted, it can memorize with inspection information as information which specifies livestock to be examined, for example.

[0016][Other Example(s)]Hereafter, another example is listed.

** in the above-mentioned example, various shape of the ferrite substrate 1 can be boiled and can be changed, such as forming only the winding part of the antenna coil AC in tabular [cylindrical or thick], and improving the receiving efficiency of an electric wave, for example, although the shape of the ferrite substrate 1 is formed in the shape of a strip of paper.

[0017]** Although the case where the transponder TR is attached to livestock is illustrated in the above-mentioned example, it may attach to fishes, it can attach to the load conveyed, and can apply to various uses, such as using for discernment of the individual information of the load.

[0018]** Although direct supply of the electric power for the drive of the transponder TR is carried out from the parallel resonant circuit of the antenna coil AC and the capacitor C in the above-mentioned example, Once rectifying the electric wave received with the antenna coil AC and charging a capacitor, it is good also as composition driven with the electric power emitted from the capacitor. It is good for the transponder TR itself also as composition for which a small battery is made to be prepared.

[0019]** Although it is only having a function which the instructions from the terminal H for communication respond, and sends out individual identification information, digital-disposal-circuit SP of the transponder TR may constitute the information relevant to the livestock etc. which are transmitted from the terminal H for communication from an above-mentioned example so that memory is possible.

[0020]** Although the terminal H for communication is connected with the controlling device which is not illustrated by the cable 23 in the above-mentioned example, between the terminal H for communication and controlling devices can communicate with radio system.

[0021]** Although glass things are illustrated as the capsule G for enclosing the antenna coil AC etc. in the above-mentioned example, it can change suitably, such as constituting from a product made of resin.

[0022]** Although PSK modulation of the individual identification information was carried out and it has transmitted to the terminal for communication in the above-mentioned example, it may be made to transmit in ASK modulation, the FSK abnormal conditions, etc.

[0023]In order to make contrast with a drawing convenient at the paragraph of a claim, numerals are described, but this invention is not limited to the structure of an accompanying drawing by this entry.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view concerning the example of the transponder of this invention

[Drawing 2] The block diagram concerning the example of this invention

[Drawing 3] The explanatory view of the condition of use concerning the example of this invention

[Drawing 4] The outline lineblock diagram concerning conventional technology

[Drawing 5] The outline lineblock diagram concerning conventional technology

[Description of Notations]

1 Ferrite substrate

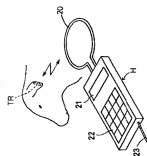
AC Antenna coil

G Capsule

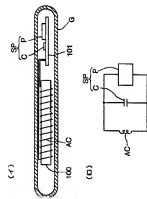
SP Digital disposal circuit

[Translation done.]

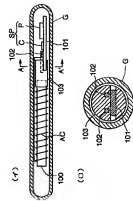
【図3】



【図4】



【図5】



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